

CLASS 382 IMAGE ANALYSIS

- APPLICATIONS**
- 100 . Mail processing
 - 102 . . ZIP code
 - 103 . Target tracking or detecting
 - 104 . Vehicle or traffic control (e.g., auto, bus, or train)
 - 105 . . License plate
 - 106 . Range or distance measuring
 - 107 . Motion or velocity measuring
 - 108 . Surface texture or roughness measuring
 - 109 . Seismic or geological sample measuring
 - 110 . Animal, plant, or food inspection
 - 111 . Textiles or clothing
 - 112 . Document or print quality inspection (e.g., newspaper, photographs, etc.)
 - 113 . Reading maps, graphs, drawings, or schematics
 - 114 . Reading aids for the visually impaired
 - 115 . Personnel identification (e.g., biometrics)
 - 116 . . Using a combination of features (e.g., signature and fingerprint)
 - 117 . . Using a characteristic of the eye
 - 118 . . Using a facial characteristic
 - 119 . . Using a signature
 - 120 . . . Sensing pressure together with speed or acceleration
 - 121 . . . Sensing pressure only
 - 122 . . . Sensing speed or acceleration only
 - 123 . . . Sensing geometrical properties
 - 124 . . Using a fingerprint
 - 125 . . . Extracting minutia such as ridge endings and bifurcations
 - 126 . . . With a guiding mechanism for positioning finger
 - 127 . . . With a prism
 - 128 . Biomedical applications
 - 129 . . DNA or RNA pattern reading
 - 130 . . Producing difference image (e.g., angiography)
 - 131 . . Tomography (e.g., CAT scanner)
 - 132 . . X-ray film analysis (e.g., radiography)
 - 133 . . Cell analysis, classification, or counting
 - 134 . . . Blood cells
 - 135 . Reading paper currency
 - 136 . Reading coins
 - 137 . Reading bank checks (e.g., documents bearing E-13B type characters)
 - 138 . . Reading monetary amount
 - 139 . . Reading MICR data

- 140 . . . Including an optical imager or reader
- 141 . Manufacturing or product inspection
- 142 . . Bottle inspection
- 143 . . Inspection of packaged consumer goods
- 144 . . Mask inspection (e.g., semiconductor
photomask)
- 145 . . Inspection of semiconductor device or printed
circuit board
- 146 . . . Measuring external leads
- 147 . . . Inspecting printed circuit boards
- 148 . . . At plural magnifications or resolutions
- 149 . . . Fault or defect detection
- 150 Faulty soldering
- 151 . . . Alignment, registration, or position
determination
- 152 . . Tool, workpiece, or mechanical component
inspection
- 153 . Robotics
- 154 . 3-D or stereo imaging analysis

LEARNING SYSTEMS

- 156 . Neural networks
- 157 . . Network learning techniques (e.g., back
propagation)
- 158 . . Network structures
- 159 . Trainable classifiers or pattern recognizers (e.g.,
adaline, perceptron)
- 160 . . Generating a standard by statistical analysis
- 161 . . Alphanumerics

COLOR IMAGE PROCESSING

- 163 . Drop-out color in image (i.e., color to be
removed)
- 164 . Image segmentation using color
- 165 . Pattern recognition or classification using color
- 166 . Compression of color images
- 167 . Color correction

HISTOGRAM PROCESSING

- 169 . With a gray-level transformation (e.g., uniform
density transformation)
- 170 . With pattern recognition or classification
- 171 . For segmenting an image
- 172 . For setting a threshold

IMAGE SEGMENTATION

- 174 . Using projections (i.e., shadow or profile of
characters)
- 175 . Separating document regions using preprinted
guides or markings
- 176 . Distinguishing text from other regions
- 177 . Segmenting individual characters or words
- 178 . . Separating touching or overlapping characters
- 179 . . Segmenting hand-printed characters
- 180 . Region labeling (e.g., page description language)

181 PATTERN RECOGNITION

- 182 . Limited to specially coded, human-readable characters
- 183 .. Characters formed entirely of parallel bars (e.g., CMC-7)
- 184 .. With separate timing or alignment marks
- 185 . Ideographic characters (e.g., Japanese or Chinese)
- 186 . Unconstrained handwriting (e.g., cursive)
- 187 . On-line recognition of handwritten characters
- 188 .. Writing on ordinary surface (i.e., electronics are in pen)
- 189 .. With a display
- 190 . Feature extraction
- 191 .. Multispectral features (e.g., frequency, phase)
- 192 .. Feature counting
- 193 ... Counting intersections of scanning lines with pattern
- 194 ... Counting individual pixels or pixel patterns
- 195 .. Local or regional features
- 196 ... Slice codes
- 197 ... Directional codes and vectors (e.g., Freeman chains, compasslike codes)
- 198 Extracted from alphanumeric characters
- 199 ... Pattern boundary and edge measurements
- 200 Measurements made on alphanumeric characters
- 201 ... Point features (e.g., spatial coordinate descriptors)
- 202 ... Linear stroke analysis (e.g., limited to straight lines)
- 203 ... Shape and form analysis
- 204 Topological properties (e.g., number of holes in a pattern, connectivity, etc.)
- 205 ... Local neighborhood operations (e.g., 3x3 kernel, window, or matrix operator)
- 206 .. Global features (e.g., measurements on image as a whole, such as area, projections, etc.)
- 207 .. Waveform analysis
- 208 ... With a tapped delay line
- 209 . Template matching (e.g., specific devices that determine the best match)
- 210 .. Spatial filtering (e.g., holography)
- 211 ... With electrically controlled light modulator or filter
- 212 .. Nonholographic optical mask or transparency
- 213 ... Using both positive and negative masks or transparencies
- 214 ... With a display
- 215 .. Using dynamic programming or elastic templates (e.g., warping)
- 216 .. At multiple image orientations or positions
- 217 .. Electronic template

- 218 . . . Comparator
- 219 Determining both similarities and differences
- 220 Calculating weighted similarity or difference
(e.g., don't-care areas)
- 221 Counting difference pixels
- 222 Using an Exclusive-OR gate
- 223 . . . Resistor matrix
- 224 . Classification
- 225 . . Cluster analysis
- 226 . . Sequential decision process (e.g., decision tree
structure)
- 227 . . . With a multilevel classifier
- 228 . . Statistical decision process
- 229 . Context analysis or word recognition (e.g.,
character string)
- 230 . . Trigrams or digrams
- 231 . . Checking spelling for recognition
- 232 **IMAGE COMPRESSION OR CODING**
- 233 . Including details of decompression
- 234 . Parallel coding architecture
- 235 . Substantial processing of image in compressed
form
- 236 . Interframe coding (e.g., difference or motion
detection)
- 237 . Gray level to binary coding
- 238 . Predictive coding
- 239 . Adaptive coding (i.e., changes based upon
history, activity, busyness, etc.)
- 240 . Pyramid, hierarchy, or tree structure
- 241 . Polygonal approximation
- 242 . Contour or chain coding (e.g., Bezier)
- 243 . Shape, icon, or feature-based compression
- 244 . Lossless compression
- 245 . . Run-length coding
- 246 . . Huffman or variable-length coding
- 247 . . Arithmetic coding
- 248 . Transform coding
- 249 . . Fractal
- 250 . . Discrete cosine or sine transform
- 251 . Quantization
- 252 . . Error diffusion or dispersion
- 253 . . Vector quantization
- 254 **IMAGE ENHANCEMENT OR RESTORATION**
- 255 . Focus measuring or adjusting (e.g., deblurring)
- 256 . Object boundary expansion or contraction
- 257 . . Dilation or erosion (e.g., opening or closing)
- 258 . . Line thinning or thickening
- 259 . . . Skeletonizing
- 260 . Image filter
- 261 . . Adaptive filter
- 262 . . Median filter

- 263 .. Highpass filter (i.e., for sharpening or enhancing details)
- 264 .. Lowpass filter (i.e., for blurring or smoothing) ✓
- 265 .. Recursive filter
- 266 . Edge or contour enhancement
- 267 .. Minimize discontinuities in dot-matrix image data (i.e., connecting or merging the dots)
- 268 .. Minimize discontinuities at boundaries of image blocks (i.e., reducing blocking effects or effects of wrap-around)
- 269 .. Minimize jaggedness in edges (e.g., anti-aliasing)
- 270 ✓ . Variable threshold, gain, or slice level
- 271 . Based on the results of a count
- 272 .. Based on a local average, mean, or median
- 273 .. Based on peak levels
- 274 . Intensity, brightness, contrast, or shading correction
- 275 . Artifact removal or suppression (e.g., distortion correction)

276 **IMAGE TRANSFORMATION OR PREPROCESSING**

- 277 . Transforming each dimension separately
- 278 . Correlation
- 279 . Convolution
- 280 . Fourier transform
- 281 . Walsh, Hough, or Hadamard transform
- 282 . Selecting a portion of an image
- 283 .. Using a mask
- 284 . Combining image portions (e.g., portions of oversized documents)
- 285 . Mapping 2-D image onto a 3-D surface
- 286 . Measuring image properties (e.g., length, width, or area)
- 287 .. Detecting alignment marks
- 288 .. Determining center of gravity or moment
- 289 .. Determining amount an image is rotated or skewed
- 290 ... Where the image is a character, word, or text
- 291 .. Determining the position of an object
- 292 ... Where the object is a character, word, or text
- 293 . Changing the image coordinates
- 294 .. Registering or aligning multiple images to one another
- 295 .. To position or translate an image
- 296 .. To rotate an image
- 297 ... Rotation of image is limited to 90 degrees, 180 degrees, or 270 degrees
- 298 .. To change the scale or size of an image
- 299 ... Raising or lowering the image resolution (e.g., subpixel accuracy)
- 300 Interpolation
- 301 ... Where the image is an alphanumeric character

- 302 . Multilayered image transformations
- 303 . . Pipeline processing
- 304 . . Parallel processing
- 305 . Image storage or retrieval
- 306 . . Using identification indicia on document
- 307 . General purpose image processor
- 308 . . Morphological operations (i.e., local
neighborhood operations)
- 309 **EDITING, ERROR CHECKING, OR CORRECTION**
(E.G., POSTRECOGNITION PROCESSING)
- 310 . Correcting alphanumeric recognition errors
- 311 . Including operator interaction
- 312 **IMAGE SENSING**
- 313 . Hand-held
- 314 . . Sensing mechanism in stylus
- 315 . . Sensing mechanism in platen
- 316 . Curve tracer
- 317 . Sensor control (e.g., OCR sheet controls copier
or fax)
- 318 . Multiple scanning
- 319 . . Prescanning
- 320 . Magnetic
- 321 . Optical (e.g., OCR)
- 322 . . Single spot
- 323 . . Single line
- 324 . . Full retina
- 325 **MISCELLANEOUS**

FOREIGN ART COLLECTIONS**FOR 000 CLASS-RELATED FOREIGN DOCUMENTS**